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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/070,288	02/28/2002	Naoki Nakanishi	10873.887USWO	4606

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EXAMINER

AGUSTIN, PETER VINCENT

ART UNIT	PAPER NUMBER
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2652

DATE MAILED: 06/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/070,288

Applicant(s)

NAKANISHI ET AL.

Examiner

Peter Vincent Agustin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 11-21 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 11-21 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 February 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Japan on 07/05/2000. It is noted, however, that applicant has not filed a certified copy of the 2000-203387 application as required by 35 U.S.C. 119(b).

Drawings

2. Figure 10 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-4, 9 & 16 rejected under 35 U.S.C. 102(b) as being anticipated by Yamazaki (US 5,608,695).

In regard to claim 1, Yamazaki discloses an optical semiconductor device (figure 6) comprising: a laser element (29); an emitted beam dividing portion (28b) for dividing an emitted

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light beam from the laser element into a plurality of light beams; a reflected beam dividing portion (28a) for dividing a reflected light beam from an information recording medium into light beams in different focused states; servo-signal-detecting photodetector elements (figure 7, elements 31 & 34; see also column 5, line 15) for receiving the reflected light beams obtained by the division by the reflected beam dividing portion in a defocused state; a first diffraction grating (figure 6, element 28b) that is provided in the emitted beam dividing portion and that diffracts the reflected light beam having passed through the reflected beam dividing portion; and a signal-detecting photodetector element (figure 7, elements 32 & 33) for receiving reflected light beams having been subjected to the diffraction by the first diffraction grating.

In regard to claim 2, Yamazaki discloses that the reflected light beam from the information recording medium that is diffracted by the first diffraction grating substantially focuses on a surface of the signal-detecting photodetector element (as shown in figure 6).

In regard to claim 3, Yamazaki discloses that two diffracted light beams of the same order diffraction (column 4, lines 39-43) by the first diffraction grating are subjected to the diffraction with different diffraction efficiencies, and the diffracted light beam having the higher diffraction efficiency is received by the signal-detecting photodetector element (one of elements 32 & 33 of figure 7).

In regard to claim 4, Yamazaki discloses that each grating in the first diffraction grating is of an inclined type having a triangular cross-sectional shape (see figure 6, element 28b).

In regard to claim 9, Yamazaki discloses that the first diffraction grating is composed of a plurality of diffraction grating regions that divide a spot of the reflected light beam equally (see figure 7, elements 35-38).

In regard to claim 16, Yamazaki discloses an optical information processing device (figures 5 & 6) comprising: a laser element (29); an emitted beam dividing portion (28b) for dividing an emitted light beam from the laser element into a plurality of light beams; an optical system (22) for guiding the light beams obtained by the division by the emitted beam dividing portion to an information recording medium (23); a reflected beam dividing portion (28a) for dividing a reflected light beam from the information recording medium into light beams in different focused states; servo-signal-detecting photodetector elements (figure 7, elements 31 & 34; see also column 5, line 15) for receiving the reflected light beams obtained by the division by the reflected beam dividing portion in a defocused state; a first diffraction grating (figure 6, element 28b) that is provided in the emitted beam dividing portion and that diffracts the reflected light beam having passed through the reflected beam dividing portion; and a signal-detecting photodetector element (figure 7, elements 32 & 33) for receiving reflected light beams having been subjected to the diffraction by the first diffraction grating.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 5 rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki in view of Opheij et al. (hereafter Opheij) (US 4,918,679).

For a description of Yamazaki, see the rejection above. However, Yamazaki does not disclose that the gratings are in a curved line form.

Opheij discloses gratings in a curved line form (see figures 7 & 8). It would have been obvious to one of ordinary skill in the art at the time of invention by the applicant to have used the curved gratings of Opheij for the emitted beam dividing portion of Yamazaki, the motivation being to ensure high quality imaging of the radiation source in the scanning spot of the optical recording medium (column 3, lines 18-27).

8. Claims 6-8 rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki in view of Heemskerk (US 4,665,310).

For a description of Yamazaki, see the rejection above. In regard to claim 6, Yamazaki does not disclose that the first diffraction grating is composed of a plurality of diffraction grating regions having the same diffraction efficiency. In regard to claim 7, Yamazaki does not disclose that the first diffraction grating is composed of at least two diffraction grating regions that differ from each other in a direction in which gratings are arranged. In regard to claim 8, Yamazaki does not disclose that the first diffraction grating is composed of diffraction grating regions having the same grating periodic interval.

Heemskerk discloses a diffraction grating (figure 2) composed of a plurality of diffraction grating regions (13) having the same diffraction efficiency and the same grating periodic interval (claims 6 & 8). It would have been obvious to one of ordinary skill in the art at the time of invention by the applicant to have used the diffraction grating having regions of the same diffraction efficiency and periodic interval of Heemskerk for the device of Yamazaki, the motivation being to avoid undesired effects such as different diffraction efficiencies of the sub-gratings and focusing of the sub-beams in different planes (column 4, lines 10-17).

Heemskerk discloses a diffraction grating (figure 2) composed of two diffraction grating regions (13 & 14) that differ from each other in a direction in which the gratings are arranged (claim 7). It would have been obvious to one of ordinary skill in the art at the time of invention by the applicant to have used the two-region diffraction grating of Heemskerk for the device of Yamazaki, the motivation being to avoid an offset of the focus-servo signal caused by wavelength variations of the beam (column 4, lines 18-27).

9. Claim 11 rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki in view of Miyazaki et al. (hereafter Miyazaki) (JP 10134395 A).

For a description of Yamazaki, see the rejection above. However, Yamazaki does not disclose that when the emitted beam dividing portion is positioned on an optical axis extending between an emission point of the laser element and a main spot formed via an objective lens on the information recording medium, the reflected light beam from the foregoing information recording medium entering a region satisfying a formula shown below is divided so as to be collected on the signal-detecting photodetector element: $r \leq d \times \tan(\sin^{-1}(NA))$ where: d represents an air-equivalent distance from the emission point of the laser element to the emitted beam dividing portion; NA represents a numerical aperture of the objective lens; and r represents a distance from a point at which the optical axis and the emitted beam dividing portion cross each other on the emitted beam dividing portion.

Miyazaki discloses an optical pickup having dimensions satisfying an equation very similar to the claimed $r \leq d \times \tan(\sin^{-1}(NA))$, wherein the purpose is to prevent undesired crosstalk and to enable accurate signal detection (see abstract and figure 5). It would have been obvious to one of ordinary skill in the art at the time of invention by the applicant to have used

the equation of Miyazaki to provide a size boundary for the beam spot of Yamazaki, the motivation being to prevent undesired crosstalk and to enable accurate signal detection.

10. Claims 12 & 13 rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki in view of Kurata et al. (hereafter Kurata) (US 5,111,449).

In regard to claim 12, Yamazaki discloses an optical element (figure 6) comprising: a first optical element (28b) that is provided on one surface of a transparent member (28) and that includes a first diffraction grating; and a second optical element (28a) that is provided on the other surface of the transparent member and that divides a reflected light beam into light beams in different focused states. Yamazaki, however, does not disclose that the first optical element includes a second diffraction grating wherein the first and second diffraction gratings are juxtaposed in a first direction, and gratings of the first diffraction grating are arranged in a direction different from the first direction.

Kurata discloses an optical element (figure 5, element 2) having first (2b) and second (2a) diffraction gratings juxtaposed in a first direction (track direction), and gratings of the first diffraction grating are arranged in a direction different from the first direction. It would have been obvious to one of ordinary skill in the art at the time of invention by the applicant to have used the optical element of Kurata for the device of Yamazaki, the motivation being to reduce the number of optical parts and to enable accurate tracking servo control (column 4, lines 49-65).

Furthermore, in regard to claim 13, Kurata discloses that the first diffraction grating is of an inclined type having a triangular cross-sectional shape (see figure 6, element 28b).

11. Claim 14 rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki & Kurata as applied to claim 12 above, and further in view of Opheij.

For a description of Yamazaki & Kurata, see the rejection above. However, Yamazaki does not disclose that the gratings are in a curved line form.

Opheij discloses gratings in a curved line form (see figures 7 & 8). It would have been obvious to one of ordinary skill in the art at the time of invention by the applicant to have used the curved gratings of Opheij for the emitted beam dividing portion of Yamazaki, the motivation being to ensure high quality imaging of the radiation source in the scanning spot of the optical recording medium (column 3, lines 18-27).

12. Claim 15 rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki & Kurata as applied to claim 12 above, and further in view of Heemskerk.

For a description of Yamazaki & Kurata, see the rejection above. However, Yamazaki does not disclose that the first diffraction grating is composed of at least two diffraction grating regions that differ from each other in a direction in which gratings are arranged.

Heemskerk discloses a diffraction grating (figure 2) composed of two diffraction grating regions (13 & 14) that differ from each other in a direction in which the gratings are arranged (claim 7). It would have been obvious to one of ordinary skill in the art at the time of invention by the applicant to have used the two-region diffraction grating of Heemskerk for the device of Yamazaki, the motivation being to avoid an offset of the focus-servo signal caused by wavelength variations of the beam (column 4, lines 18-27).

13. Claims 17-21 rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki in view of Hasegawa et al. (hereafter Hasegawa) (US 5,881,043).

For a description of Yamazaki, see the rejection above. Furthermore, in regard to claim 18, Yamazaki discloses that a pair of the servo-signal-detecting photodetector elements (figure 7,

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elements 31 & 34) are arranged symmetrically with respect to an optical axis; and the signal-detecting photodetector element (32 or 33) is arranged at a shorter distance from the optical axis than the servo-signal-detecting photodetector elements, wherein the pair of the servo-signal-detecting photodetector elements and the signal-detecting photodetector element are integrated (see figure 6, element 26). However, Yamazaki does not disclose that the signal-detecting photodetector has a light-receiving area smaller than a light-receiving area of the servo-signal-detecting photodetector elements (claims 17 & 18).

Hasegawa discloses a signal-detecting photodetector (figure 2, elements 3a & 3b) having a light receiving area smaller than a light-receiving area of servo-signal-detecting photodetector elements (4a & 4b). It would have been obvious to one of ordinary skill in the art at the time of invention by the applicant to have used the signal-detecting photodetector smaller than a servo-signal-detecting photodetector for the device of Yamazaki as suggested by Hasegawa, the motivation being to reduce the space consumption and weight of the optical device (see column 1, lines 33-45).

Furthermore, in regard to claim 19, Yamazaki discloses that the signal-detecting photodetector element is positioned closer to one of the servo-signal-detecting photodetector elements (see figures 6 and 7).

In regard to claim 20, Yamazaki discloses that the signal-detecting photodetector element is provided in substantially a same plane as the emission point (see figure 6, element 29).

In regard to claim 21, Yamazaki discloses that the signal-detecting photodetector element is divided into a plurality of detecting sections having substantially equal areas (see figure 7, elements 32 & 33).

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kay et al. (US 5,544,143) discloses a read/write laser detector grating unit with an orthogonally-arranged focus and tracking sensor system. Figure 1 discloses a signal photodetector (72) and a servo photodetector (68).

Yamanaka (US 4,894,815) discloses an optical head with diffraction gratings having sub-gratings of opposite directions.

Lee et al. (US 5,805,556) discloses an optical pickup apparatus having a holographic optical element. Figure 6 shows a photodetector that receives a reflected beam after passing through a first element 8.

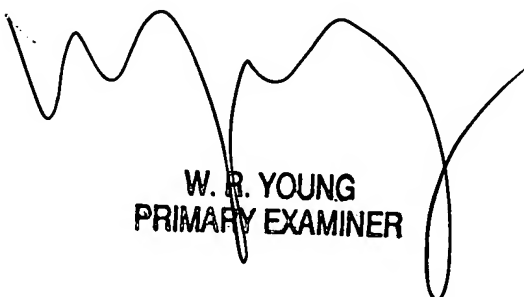
Kurata et al. (US 5,391,865) discloses an optical element having an emitted beam dividing portion and a reflected beam dividing portion, but does not show the reflected light beam passing through the emitted light beam dividing portion.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter Vincent Agustin whose telephone number is (703) 305-8980. The examiner can normally be reached on Monday thru Friday 9:00AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PVA
05/19/2004



W. R. YOUNG
PRIMARY EXAMINER